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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
09/384,186	08/27/99	MATSUYAMA H	12922

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SCULLY SCOTT MURPHY & PRESSER
400 GARDEN CITY PLAZA
GARDEN CITY NY 11530

EXAMINER	
NGUYEN, H	
ART UNIT	**PAPER NUMBER**
2871	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No.	Applicant(s)	
	09/384,186	MATSUYAMA, HIROAKI	
	Examiner	Art Unit	
	HOAN C. NGUYEN	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-41 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-41 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

15) ☒ Notice of References Cited (PTO-892)
16) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4 .
18) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
19) ☐ Notice of Informal Patent Application (PTO-152)
20) ☐ Other: .

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

1. Claims 1, 5, 6, 17, 23, 24, 34 are rejected under 35 U.S.C. 102(e) as being anticipated by Shimada et al. (US6097459A). Shimada discloses in Fig. 16 that a multi-domain alignment active-matrix LCD device comprises (a) first and second transparent plates 31 and 45 arranged to oppose each other; (b) first plate having disposed thereon a plurality of scanning lines and signal lines, thin film transistor (TFT) provided in the vicinity of intersections between the scanning and signal lines (as shown in Fig. 15), pixel electrode 38 connected to the TFT; (b) second plate having a black matrix 46b provided with openings at areas that oppose pixel electrodes, color player 46a, counter electrode 47 provided so as to oppose pixel electrodes; (c) a liquid crystal 49 being sandwiched between the opposing first and second plates and being controlled by voltage impressed across pixel electrodes and counter electrodes; (b) orientation layer 44 provided on each pixel electrodes of first plate via insulating film 48a, orientation layer 44 formed into curved surface and orient molecules of the liquid crystal aligned in direction normal to curved surface of orientation layer as disclosed in abstract; (d) columnar spacer are provided between the two opposing plates for regulating a panel gap there between (column 11, lines 12-13).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 2, 3, 8, 9, 12, 18, 19, 25, 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al. (US6097459A) in view of Miyaji et al. (JP411174467A) and Yamanaka et al. (US5986729A).

Shimada discloses in Fig. 16 that a multi-domain alignment active-matrix LCD device comprises (a) first and second transparent plates 31 and 45 arranged to oppose each other; (b) first plate having disposed thereon a plurality of scanning lines and signal lines, thin film transistor (TFT) provided in the vicinity of intersections between the scanning and signal lines (as shown in Fig. 15), pixel electrode 38 connected to the TFT; (b) second plate having a black matrix 46b provided with openings at areas that oppose pixel electrodes, color player 46a, counter electrode 47 provided so as to oppose pixel electrodes; (c) a liquid crystal 49 being sandwiched between the opposing first and second plates and being controlled by voltage impressed across pixel electrodes and counter electrodes; (b) orientation layer 44 provided on each pixel electrodes of first plate via insulating film 48a, orientation layer 44 formed into curved surface and oriented molecules of the liquid crystal aligned in direction normal to curved surface of orientation layer as disclosed in abstract, orientation layer 44 defined a cavity recess toward first plate or a protrusion directed toward second plate; (d) columnar spacer are provided between the two opposing plates for regulating a panel gap there between

(column 11, lines 12-13). Shimada does not disclose expressly that (a) columnar spacer is disposed approximately at a center of orientation layer formed on first plate, (b) columnar spacer has diameter that becomes progressive smaller in the direction of second plate.

Miyaji discloses that that (a) columnar spacer 5 is disposed approximately at a center of orientation layer formed on first plate as Fig. 8 shown (b) columnar spacer has diameter that becomes progressive smaller in the direction of second plate as shown in Fig. 2. Yamanaka also discloses that (a) columnar spacer can be disposed approximately at a center of orientation layer formed on first plate as Fig. 8 shown (b) columnar spacer has diameter that becomes progressive smaller in the direction of second plate as shown in Fig. 9.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the multi-domain alignment active-matrix LCD device. The modified device further comprises (a) columnar spacer disposed approximately at a center of orientation layer formed on first plate for supporting the counter electrode; (b) columnar spacer has diameter that becomes progressive smaller in the direction of second plate for preventing alignment disturbance.

3. Claims 4, 10, 11, 13, 15, 16, 20-22, 27-33, 35-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al. (US6097459A) in view of Miyaji et al. (JP411174467A) and Yamanaka et al. (US5986729A), and in further view of Asuma et al (JP2000019527A).

Shimada discloses in Fig. 16 that a multi-domain alignment active-matrix LCD device comprises (a) first and second transparent plates 31 and 45 arranged to oppose each other; (b) first plate having disposed thereon a plurality of scanning lines and signal lines, thin film transistor (TFT) provided in the vicinity of intersections between the scanning and signal lines (as shown in Fig. 15), pixel electrode 38 connected to the TFT; (b) second plate having a black matrix 46b provided with openings at areas that oppose pixel electrodes, color player 46a, counter electrode 47 provided so as to oppose pixel electrodes; (c) a liquid crystal 49 being sandwiched between the opposing first and second plates and being controlled by voltage impressed across pixel electrodes and counter electrodes; (b) orientation layer 44 provided on each pixel electrodes of first plate via insulating film 48a, orientation layer 44 formed into curved surface and oriented molecules of the liquid crystal aligned in direction normal to curved surface of orientation layer as disclosed in abstract, orientation layer 44 defined a cavity recess toward first plate or a protrusion directed toward second plate; (d) columnar spacer are provided between the two opposing plates for regulating a panel gap there between (column 11, lines 12-13). Shimada also discloses in Fig. 14 that a wiring layer 37 is provided beneath pixel electrode and connects a source or drain electrode of TFT and pixel electrode via a contact hole 43. Shimada does not disclose expressly that (a) columnar spacer is disposed approximately at a center of orientation layer formed on first plate; (b) columnar spacer has diameter that becomes progressive larger in the direction of second plate; (c) the liquid crystal molecules contiguous to the surface of the columnar spacer are aligned substantially parallel to the surface of the columnar spacer.

Miyaji discloses that that (a) columnar spacer 5 is disposed approximately at a center of orientation layer formed on first plate as Fig. 8 shown (b) columnar spacer has diameter that becomes progressive smaller in the direction of second plate as shown in Fig. 2. Yamanaka also discloses that (a) columnar spacer can be disposed approximately at a center of orientation layer formed on first plate as Fig. 8 shown (b) columnar spacer has diameter that becomes progressive smaller in the direction of second plate as shown in Fig. 9. However, both Miyaji and Yamanaka fail to disclose that (a) columnar spacer has diameter that becomes progressive larger in the direction of second plate; (b) the liquid crystal molecules contiguous to the surface of the columnar spacer are aligned substantially parallel to the surface of the columnar spacer.

Asuma discloses in Figs. 2 and 8 that (a) columnar spacer has diameter that becomes progressive larger in the direction of second plate; (b) the liquid crystal molecules ORI2 contiguous to the surface of the columnar spacer can possibly be aligned substantially parallel to the surface of the columnar spacer.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the multi-domain alignment active-matrix LCD device. The modified device further comprises (a) columnar spacer disposed approximately at a center of orientation layer formed on first plate for supporting the counter electrode; (b) columnar spacer has diameter that becomes progressive larger in the direction of second plate for preventing alignment disturbance; (c) the liquid crystal molecules contiguous to the surface of the columnar spacer can possibly be aligned substantially parallel to the surface of the columnar spacer for adjusting orientation of liquid crystal molecules near to the surface of columnar spacer, thus avoiding display

failure due to disturbance in the alignment of liquid crystal molecules or preventing production of bright spots or black spot defects in the effective pixel region.

4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al. (US6097459A) in view of Tsunoda et al. (US4938569).

Shimada discloses in Fig. 16 that a multi-domain alignment active-matrix LCD device comprises (a) first and second transparent plates 31 and 45 arranged to oppose each other; (b) first plate having disposed thereon a plurality of scanning lines and signal lines, thin film transistor (TFT) provided in the vicinity of intersections between the scanning and signal lines (as shown in Fig. 15), pixel electrode 38 connected to the TFT; (b) second plate having a black matrix 46b provided with openings at areas that oppose pixel electrodes, color player 46a, counter electrode 47 provided so as to oppose pixel electrodes; (c) a liquid crystal 49 being sandwiched between the opposing first and second plates and being controlled by voltage impressed across pixel electrodes and counter electrodes; (b) orientation layer 44 provided on each pixel electrodes of first plate via insulating film 48a, orientation layer 44 formed into curved surface and orient molecules of the liquid crystal aligned in direction normal to curved surface of orientation layer as disclosed in abstract; (d) columnar spacer are provided between the two opposing plates for regulating a panel gap there between (column 11, lines 12-13). Shimada does not disclose expressly that the orientation layer is formed by oblique vapor deposition of SiO.

Tsunoda discloses orientation layer formed by oblique vapor deposition of SiO (column 2, lines 27-34) since SiO film is aligned in direction of the film growth (for a good example of the technique, see US3834792 to Janning).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the multi-domain alignment active-matrix LCD device. The modified device has orientation layer formed by oblique vapor deposition of SiO for aligning the orientation layer.

5. Claims 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shimada et al. (US6097459A) in view of Miyaji et al. (JP411174467A), Yamanaka et al. (US5986729A), Asuma et al (JP2000019527A), and in further view of Koe (US6097462A).

Shimada discloses in Fig. 16 that a multi-domain alignment active-matrix LCD device comprises (a) first and second transparent plates 31 and 45 arranged to oppose each other; (b) first plate having disposed thereon a plurality of scanning lines and signal lines, thin film transistor (TFT) provided in the vicinity of intersections between the scanning and signal lines (as shown in Fig. 15), pixel electrode 38 connected to the TFT; (b) second plate having a black matrix 46b provided with openings at areas that oppose pixel electrodes, color player 46a, counter electrode 47 provided so as to oppose pixel electrodes; (c) a liquid crystal 49 being sandwiched between the opposing first and second plates and being controlled by voltage impressed across pixel electrodes and counter electrodes; (b) orientation layer 44 provided on each pixel electrodes of first plate via insulating film 48a, orientation layer 44 formed into curved surface and oriented

molecules of the liquid crystal aligned in direction normal to curved surface of orientation layer as disclosed in abstract, orientation layer 44 defined a cavity recess toward first plate or a protrusion directed toward second plate; (d) columnar spacer are provided between the two opposing plates for regulating a panel gap there between (column 11, lines 12-13). Shimada also discloses in Fig. 14 that a wiring layer 37 is provided beneath pixel electrode and connects a source or drain electrode of TFT and pixel electrode via a contact hole 43. Shimada does not disclose expressly that (a) columnar spacer is disposed approximately at a center of orientation layer formed on first plate; (b) columnar spacer has diameter that becomes progressive larger in the direction of second plate; (c) a wiring layer expends in direction substantially in agreement with the direction of a transmission axis of a polarizer provided on first or second plate.

Miyaji discloses that that (a) columnar spacer 5 is disposed approximately at a center of orientation layer formed on first plate as Fig. 8 shown (b) columnar spacer has diameter that becomes progressive smaller in the direction of second plate as shown in Fig. 2. Yamanaka also discloses that (a) columnar spacer can be disposed approximately at a center of orientation layer formed on first plate as Fig. 8 shown (b) columnar spacer has diameter that becomes progressive smaller in the direction of second plate as shown in Fig. 9. However, both Miyaji and Yamanaka fail to disclose columnar spacer has diameter that becomes progressive larger in the direction of second plate.

Asuma discloses in Figs. 2 and 8 that columnar spacer has diameter that becomes progressive larger in the direction of second plate. Asuma fails to disclose a wiring layer expending in direction substantially in agreement with the direction of a transmission axis of a polarizer provided on first or second plate.

Koe discloses in Figs 1 and 5 that the wire layers expend direction substantially in agreement with the directions of a transmission axis of polarizers 18, 20 provided on first and second plate.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the multi-domain alignment active-matrix LCD device. The modified device further comprises (a) columnar spacer disposed approximately at a center of orientation layer formed on first plate for supporting the counter electrode; (b) columnar spacer has diameter that becomes progressive larger in the direction of second plate for preventing alignment disturbance; (c) a wiring layer expending in direction substantially in agreement with the direction of a transmission axis of a polarizer provided on first or second plate for avoiding polarized-light scattering due to a crossing of wiring layer and direction of a transmission axis of polarizer.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: US5892562A to Yamazaki et al. and Nakajima (JP2000193984).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to HOAN C. NGUYEN whose telephone number is (703)306-0472. The examiner can normally be reached on MONDAY-THURSDAY:8:00AM-4:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, SIKES L WILLIAM can be reached on (703)308-4842. The fax phone numbers for the organization where this application or proceeding is assigned are

(703)308-5841 for regular communications and (703)308-5841 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0530.

HOAN C. NGUYEN
Examiner
Art Unit 2871

chn
June 27, 2001

William L. Sikes
Supervisory Patent Examiner
Technology Center 2800